NDCEE

National Defense Center for Energy and Environment

Example Transfers of Corn-Hybrid Polymer (CHP) Blasting Technology

Joint Services Environmental Management Conference

May 5-8, 2008

Bill Thomas, Brad Ashton
National Defense Center for Energy and Environment

DoD Executive Agent

Office of the Assistant Secretary of the Army (Installations and Environment)

The NDCEE is operated by: CTC *Concurrent Technologies Corporation*

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
MAY 2008		**00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Example Transfers of Corn-Hybrid Polymer (CHP) Blasting Technology	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **National Defense Center for Energy and Environment,Operated by Concurrent Technologies Corporation,100 CTC Drive,Johnstown,PA,15904**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
JSEM - Joint Services Environmental Management Training Conference & Exposition Conference, 5-8 May 2008, Denver, CO.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**12**	

Presentation Outline

- NDCEE Mission
- NDCEE Technology Transfer Approach
- CHP Technology Overview *
- CHP Demo and Transfer History
- Example Transfers
- Conclusion

* - for additional details, see JSEM presentation: B Yallay, “Corn Hybrid Polymer Media for Coatings Removal from Delicate Substrates”

National Defense Center for Energy and Environment (NDCEE)

- **Mission**
  - Serve as a national resource for researching, developing and validating environmental, safety and occupational health (ESOH) technologies and processes
  - Advance technology transfer aimed at reducing total ownership costs in support of national defense

The NDCEE was established to support DoD installations, ranges, weapons systems, and the warfighter in achieving performance advantages, enhanced efficiency, costs savings, and regulatory compliance.

NDCEE Technology Transfer

- **Technology Transfer Definition:**
  - *The activities necessary to field validated, cost-effective operational ESOH technologies for DoD installations and weapon systems*
    - Focus on actual fielding of technologies for operational use
    - Activities can occur over long period of time – multiple years and tasks

- **Two Basic Types of Transfer Efforts:**
  - "Initial" transfer : Transfer at the first demonstration / validation site
  - "Lateral" transfer : Transfer at other relevant sites throughout DoD after successful initial demonstration / validation

Corn-Hybrid Polymer (CHP) Blasting

Technology Overview

- **Description**: Low pressure blasting system for coating removal from delicate substrates using corn-hybrid polymer blast media

A ship radome section (left) is stripped at low pressure (right) using the CHP blasting process

- **ESOH Need:**
  - Environmentally acceptable coatings removal
  - Improved human health by replacing manual sanding

- **Advantages:**
  - No substrate damage, resulting in the elimination of unnecessary rework
  - Blast medium is organic, nontoxic, biodegradable, classified as nonhazardous and generates minimal waste
  - Meets MIL SPEC (MIL-P-85891) for Type VII plastic media
  - Considered a “drop-in” replacement for many plastic media stripping systems (May eliminate the use of chemical strippers)
  - Preliminary ECAM cost savings range: $20,000 - $1.5 million, for various components and facilities (results available upon request)

Corn-Hybrid Polymer (CHP) Blasting
Suggested Transfer Approaches

- **Potential Transfer Sites**:
  - Sites with high labor cost for media blasting, manual sanding or chemical stripping
  - Interested sites: Navy (4), Army (3), Air Force (1), Marine Corps (1), NASA
- **Transfer Barriers**:
  - Facility requires correctly sized, operational blast containment booths
  - For drop-in replacement, Military Service must accept CHP as meeting MIL SPEC for Type VII media
- **Lateral Transfer Approaches:**
  - Installation level - address case-by-case interest:
    - Address media containment issues
    - Conduct site specific demonstrations as required
  - Command level - seek broad Command-wide acceptance:
    - Identify Program Office POCs for approval support on selected weapon systems
    - Conduct Command-wide, high visibility demonstration / validation (dem/val) as needed
    - Seek funding support for dem/val from a variety of sources

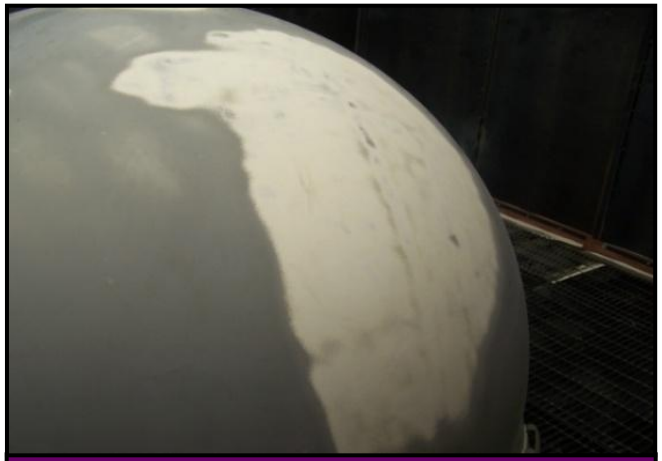
CHP Demo and Transfer History

DoD Site	Example Blasting Applications	Proof of concept	Dem / val	Transfer
Warner Robins ALC	C-130 radome, F-15 speed brake, other components	2005	2006	2008
NS Mayport *	Ship radome, antenna, Seahawk chopper	2006	2007	2008
NSB Kings Bay *	Periscope, sonar composites	2006	N/A	2006
Ft. Rucker (Contractor site)	H-60 parts, HMMWV hoods	2006	N/A	Open option
Ft. Bragg (Simmons AAF)	Aircraft composite and Al components	2006	N/A	Open option
NADEP Jacksonville *	Aircraft composite and Al components	2005	2006	2007
Corpus Christi Army Depot	H-60 blades, rotors, stabilators and other components	2008	2008	2008 (TBD)

* - To be described in more detail

Successful Transfer Example – NS Mayport

- **Testing effort:** Both proof of concept and acceptance dem / val tests
- **Applications:** Composite components and full airframe - UH-60 Seahawk
- **Status:** Appeared to be successful transfer, but site role as a Southeast Maintenance Center is changing – privatization now expected



MK-92 Radome with Area of Coating Removed using CHP

- **Key Transfer Outcomes:**
  - Provided initial chance to evaluate CHP on-site
  - Labor savings: 55.5 hours/ large part (e.g. hand sanding a ship radome)
  - Led to idea for a potential "regional implementation" concept, using either Service staff (civilian or military) or a Service Contractor

Successful Transfer Example – NSB Kings Bay

- **Testing Effort:** Only proof-of-concept tests
- **Applications:** Periscope ferrings, composite sonar window, other composites
- **Status:**
  - Rapid conversion from plastic to CHP, drop in replacement
  - Workforce: Navy staff (civilian)
- **Key Transfer Outcomes:**
  - First submarine application
  - No dem / val required – immediate transfer

Coating removed from NSS window with no visual damage

Successful Transfer Example – Fleet Readiness Center SE (NADEP Jacksonville)

- **Testing:** Both proof-of-concept and acceptance dem / val tests
- **Applications:** P3 composite radomes, other A/C composite components
- **Status:**
  - Operational for radomes and other parts
  - Workforce: Navy staff (civilian)
- **Key Transfer Outcomes:**
  - Modified existing blast booth to accommodate CHP media
  - Considering expansion to other aircraft parts

Coating removed from P-3 radome panel at a rate of 12 ft^2/hr with no visual damage

Conclusion

- **CHP illustrates both successful vertical and lateral transfer practices –** *aided by core NDCEE CHP team actions over nearly 3 years*
- **Technology Transfer requires leadership, the right conditions and a persistent commitment to action**
  - A committed end-user with a valid ESOH need
  - A mature, appropriate, usable technology solution
  - Attention to unique hurdles to be overcome in each situation
  - Appropriate and sometimes leveraged funding or information
  - A Service transfer champion (at appropriate level, e.g. depot, Command, Headquarters)
- **Further potential exists for more widespread use of CHP throughout DoD**
- **Technology Transfer is a Contact Sport**

Contact Information

NDCEE Task 429 N1 Technical Monitor Monitor

Name: Dr. Scott Sirchio

Organization: NSWCCD

Email: scott.sirchio@navy.mil

Phone Number: 301-227-5196

NDCEE Task 429 A7 Technical

Name: Mr. Tom Guinivan, P.E., BCEE

Organization: USAEC

Email: thomas.guinivan@us.army.mil

Phone Number: 410-436-5910

NDCEE Point of Contact

Name: Mr. Bill Thomas

Organization: *CTC* / NDCEE

Email: thomasw@ctc.com

Phone Number: 703-298-2358

NDCEE Point of Contact

Name: Dr. Brad Ashton

Organization: *CTC* / NDCEE

Email: ashtonw@ctc.com

Phone Number: 703-310-5653

This work was funded through the Office of the Assistant Secretary of the Army (Installations and Environment) and conducted under contract W74V8H-04-D-0005 Task 0429 A7 and 0429 N1. The views, opinions, and/or findings contained in this paper are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.